# CLAIMS

What is claimed is:

1. Method of detecting contaminants on a window surface of a viewing system, said method comprising the steps of:

reflecting light off of contaminants on said window surface;

capturing said reflected light in an image;

converting said image into image data; and

processing said image data to detect said contaminants on said window surface.

2. The method of claim 1 wherein the step of reflecting includes injecting light edgewise into the window along an axis which intersects a viewing area of the window, some of said injected light being passed through the window surface and reflected from contaminants in said viewing area of said surface.

3. The method of claim 1 wherein the step of reflecting includes reflecting light off of contaminants on an outside surface of the window back through the window and inside surface thereof.

4. The method of claim 1 wherein the step of capturing includes capturing the reflected light in an area image comprising a plurality of pixels; and wherein the step of converting includes converting said pixels of the image into electrical data representative of the image.

5. The method of claim 1 wherein the step of processing includes compensating said image data for background light in a scene of the viewing system.

6. The method of claim 1 including the steps of: capturing a first image of a scene of the viewing system excluding the reflected light; converting said first image into first image data; capturing a second image of said scene including the reflected light; converting said second image into second image data; and compensating said second image data with said first image data.

7. The method of claim 6 wherein the step of compensating includes subtracting the first image data from the second image data to produce compensated image data.

8. The method of claim 6 wherein the compensated image data comprises a multiplicity of pixel light intensity values; and including the steps of: determining a number of pixel light intensity values in the compensated image data that are greater than a predetermined value;

and determining if the contaminants on the window surface will affect a scene image of the viewing system based on said number of pixel light intensity values.

9.    The method of claim 6 including the step of capturing the first and second images within a short time interval of each other.

10.    The method of claim 1 including determining if the detected contaminants on the window surface will affect a scene image of the viewing system.

11.    Apparatus for detecting contaminants on an external surface of a window of a viewing system, said apparatus comprising:

at least one light source for reflecting light from contaminants on said external surface;

an imager for capturing an image of said reflected light and converting said image into image data; and

a processor for processing said image data to detect said contaminants on said external surface.

12.    The apparatus of claim 11 wherein the processor is operative to determine if the detected contaminants will affect a scene image of the viewing system.

13.    The apparatus of claim 11 wherein the at least one light source is disposed to inject light edgewise into the window along an axis which intersects a viewing area of the window causing some of said injected light to pass through the window surface and be reflected from contaminants in said viewing area of said surface back through the window and internal surface thereof.

14.    The apparatus of claim 13 wherein the imager is disposed behind the window to capture light reflected from the contaminants back through the window and internal surface thereof.

15.    The apparatus of claim 11 wherein the at least one source is controllable off and on; wherein the imager is operative to capture a first image of a scene of the viewing system when the at least one light source is controlled off and to capture a second image of said scene when the at least one light source is controlled on; and wherein the processor is further operative to receive first image data and second image data from the imager and to compensate said second image data with said first image data to produce compensated image data.

16. The apparatus of claim 15 wherein the compensated image data comprises a multiplicity of pixel light intensity values; and wherein the processor is operative to detect contaminants on the window surface based on pixel light intensity values exceeding a predetermined value.

17. The apparatus of claim 16 wherein the processor is operative to determine a number of pixel light intensity values in the compensated image data that exceed the predetermined value and to determine if the contaminants on the window surface will affect a scene image of the viewing system based on said number.

18. The apparatus of claim 17 wherein the processor is operative to generate a signal indicative of a condition in which contaminants on the window surface will affect a scene image of the viewing system.

19. The apparatus of claim 11 wherein the at least one light source comprises a light emitting diode.

20. The apparatus of claim 11 wherein the imager comprises a charge coupled device.

21. A viewing system comprising:

a window for protecting the viewing system from an environment of a scene viewable by the system;

an imager disposed behind said window for capturing images of said scene through a viewing area of said window and for converting said images into image data;

at least one light source disposed to inject light edgewise into said window to cause reflections of the injected light off of contaminants on said window surface, said imager also for capturing images of said scene including said light reflected from said contaminants; and

a processor for processing both of image data of said scene excluding reflected light from said contaminants, and image data of said scene including reflected light from said contaminants to detect said contaminants on said external surface.

22. The viewing system of claim 21 wherein the processor is operative to control an on and off operation of said at least one light source.

23. The viewing system of claim 21 wherein the processor is operative to compensate the image data of the scene including the reflected light with image data of the scene excluding

the reflected light to produce compensated image data, and to detect contaminants on the window surface based on the compensated image data.

24. The viewing system of claim 23 wherein the compensated image data comprises a multiplicity of pixel intensity values; and wherein the processor is operative to detect contaminants on the window surface by comparing the pixel intensity values of the compensated image data with a predetermined value.

25. The viewing system of claim 24 wherein the processor is operative to determine a number of pixel intensity values of the compensated image data that are greater than the predetermined value, and to determine whether or not to disregard a scene image based on said number.

26. The viewing system of claim 24 wherein the processor is operative to determine a number of pixel intensity values of the compensated image data that are greater than the predetermined value, and to determine whether or not to effect a cleansing of said window based on said number.

27. The viewing system of claim 21 wherein the at least one light source and imager are controlled to effect capture of the image of the scene excluding reflected light from the contaminants, and the image of the scene including reflected light from the contaminants within a short time interval of each other.

28. The viewing system of claim 21 including a digitizer for converting image data from the imager into digital image data; and wherein the processor comprises a digital signal processor for processing the digital image data in accordance with a programmed algorithm.